

What is claimed is:

1. A method for inspecting a wafer comprising:

irradiating a first electron beam onto an area of the wafer including an inspection
5 region to charge the area with first charges;

irradiating a second electron beam onto the inspection region after focusing the
second electron beam on the inspection region to inspect the inspection region; and

irradiating a third electron beam onto the area to discharge charges accumulated on
the area.

2. The method of claim 1, wherein the inspection further comprises:

irradiating the second electron beam onto the inspection region to charge the
inspection region with second charges having a polarity identical to that of the first charges;
and

15 locating a defect of the inspection region by detecting a voltage contrast of secondary
electrons emitted from the inspection region where the second electron beam is irradiated.

3. The method of claim 2, wherein the defect is detected using an image
generated from the voltage contrast.

4. The method of claim 1, wherein the first electron beam is controlled so that
the voltage contrast is sufficiently increased while the inspection region is irradiated by the
second electron beam.

25 5. The method of claim 1, wherein the third electron beam is irradiated by
controlling a beam energy so that the area charged by the first and second electron beams is
completely discharged.

6. The method of claim 1, wherein the first electron beam is irradiated to have a
30 secondary electron yield of less than 1, and the third electron beam is irradiated to have a
secondary electron yield of more than 1.

7. The method of claim 1, wherein the first electron beam is irradiated to have a secondary electron yield of more than 1, and the third electron beam is irradiated to have a secondary electron yield of less than 1.

5 8. The method of claim 1, wherein primarily charging the area, inspecting the inspection region, and discharging the area are performed repeatedly by varying inspection regions of the wafer.

9. The method of claim 1, wherein insulating layers are formed on the wafer and
10 conductive pads are formed between the insulating layers.

10. A method for inspecting a wafer comprising:
irradiating a first electron beam onto a first region of the wafer in order to primarily charge the first region;

15 irradiating a second electron beam onto an inspection region of the wafer adjacent to the first region to inspect the inspection region;

irradiating a third electron beam onto a second region of the wafer adjacent to the inspection region in order to discharge charges accumulated on the second region wherein the second region has a size identical to that of the first region and is aligned with the inspection
20 region and the first region; and

moving the wafer from the first electron beam to the third electron beam so that the first, the second and the third electron beams are irradiated onto each region of the wafer in order.

25 11. The method of claim 10, wherein inspecting the inspection region further comprises:

irradiating the second electron beam onto the inspection region to charge the inspection region with charges having a polarity identical to that of charges accumulated on the first region; and

30 locating a defect of the inspection region by detecting a voltage contrast of secondary electrons emitted from the inspection region where the second electron beam is irradiated.

12. The method of claim 11, wherein the defect is decided using an image generated from the voltage contrast.

13. The method of claim 10, wherein the first electron beam is controlled so that the voltage contrast is sufficiently increased while the inspection region is inspected by the second electron beam.

5

14. The method of claim 10, wherein the third electron beam is controlled so that the first region charged by the first and second electron beams is completely discharged.

15. The method of claim 10, wherein the first electron beam is irradiated to have a
10 secondary electron yield of the first electron beam less than 1, and the third electron beam is irradiated to have a secondary electron yield of the third electron beam more than 1.

16. The method of claim 10, wherein the first electron beam is irradiated to have a
15 secondary electron yield of the first electron beam more than 1, and the third electron beam is irradiated to have a secondary electron yield of the third electron beam less than 1.

17. The method of claim 10, wherein insulating layers are formed on the wafer, and conductive pads are formed between the insulating layers.

20 18. The method of claim 10, wherein the second region is in parallel with the inspection region and the first region.

19. An apparatus for inspecting a wafer comprising:
a chamber;

25 a stage for loading the wafer, the stage being located in the chamber and horizontally movable;

a first column for irradiating a first electron beam onto a first region of the wafer;
a second column for irradiating a second electron beam onto an inspection region of the wafer adjacent to the first region;

30 a third column for irradiating a third electron beam onto a second region of the wafer that is adjacent to the inspection region;

a signal processing means for detecting a voltage contrast signal of secondary electrons generated from the wafer by irradiating the second electron beam; and

a defect analyzing means for detecting a defect of the wafer by analyzing a signal generated from the signal processing means.

20. The apparatus of claim 19, wherein the first to third electron columns have first, second, and third energy controlling members for controlling energies of the first, second, and third electron beams, respectively.

21. The apparatus of claim 19, wherein the second column has a plurality of voltage lenses for focusing the second electron beam on the inspection region.

22. The apparatus of claim 19, further comprising a display means connected to the signal processing means for image-processing a signal generated from the signal processing means.

23. A method for inspecting a wafer for electrical defects utilizing a first electron beam, a second electron beam and a third electron beam, the method comprising: utilizing the first electron beam to irradiate an area of the wafer including an inspection region to charge the area; moving the wafer so that the second electron beam irradiates the inspection region to inspect the inspection region; detecting electrical defects in the wafer by detecting voltage contrasts generated by the second electron beam; and moving the wafer so that the third electron beam irradiates the area to discharge charges accumulated on the area.

24. The method recited in claim 23, wherein the electron beams are aligned along a straight line, and moving the wafer along the line, sequentially irradiates an area with the first, the second and the third electron beams.

25. The method recited in claim 23, wherein the second electron beam charges the inspection region with charges having a polarity identical to the charges created by the first electron beam.

26. The method of claim 23, wherein the first electron beam has a secondary electron yield less than 1, and the third electron beam has a secondary electron yield more than 1.